

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
21 April 2005 (21.04.2005)

PCT

(10) International Publication Number  
**WO 2005/036440 A3**

(51) International Patent Classification<sup>7</sup>: **G06F 19/00**

(21) International Application Number:  
PCT/IB2004/051989

(22) International Filing Date: 6 October 2004 (06.10.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/510,174 10 October 2003 (10.10.2003) US

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

**Published:**

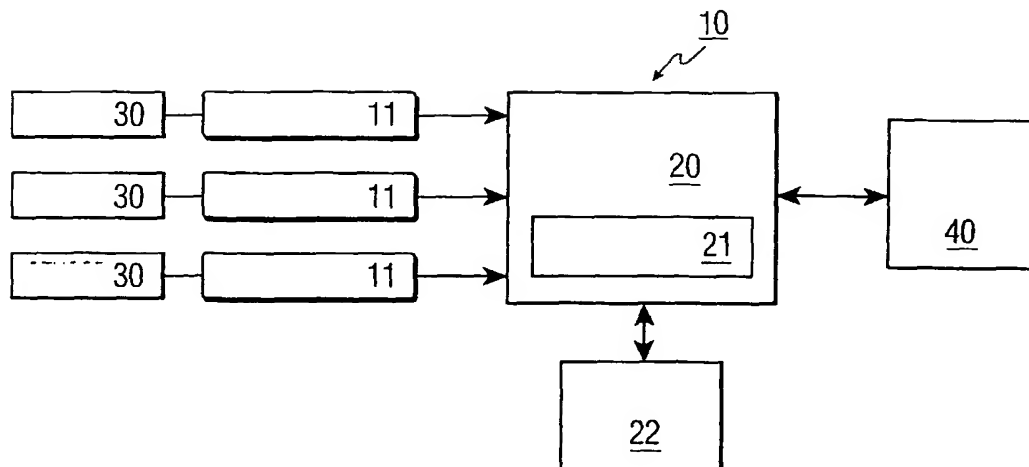
- with international search report

(88) Date of publication of the international search report:

2 March 2006

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: A SYSTEM AND METHOD TO ESTIMATE SIGNAL ARTIFACTS



(57) Abstract: A method and system are disclosed that detect signal artifacts in one or more event signals. The system and method may be used to estimate whether a monitored signal includes artifacts based upon a statistical analysis using a transform function.

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/051989

**A. CLASSIFICATION OF SUBJECT MATTER**

IPC 7 G06F19/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, INSPEC

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2003/171661 A1 (TONG DAVID A)	1-3, 5-9,
Y	11 September 2003 (2003-09-11)	11-15
	paragraphs '0041!, '0043!, '0047!	4, 10
A	THAKOR N V ET AL: "APPLICATIONS OF ADAPTIVE FILTERING TO ECG ANALYSIS: NOISE CANCELLATION AND ARRHYTHMIA DETECTION" IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, IEEE INC. NEW YORK, US, vol. 38, no. 8, 1 August 1991 (1991-08-01), pages 785-794, XP000260763 ISSN: 0018-9294	1



Further documents are listed in the continuation of box C.



Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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Date of the actual completion of the international search

5 July 2005

Date of mailing of the international search report

08/08/2005

Name and mailing address of the ISA

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## INTERNATIONAL SEARCH REPORT

International Application No

PCT/IB2004/051989

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	ROMERO S ET AL: "Reduction of eeg artifacts by ica in different sleep stages" PROCEEDINGS OF THE 25TH. ANNUAL INTERNATIONAL CONFERENCE OF THE IEEE ENGINEERING IN MEDICINE AND BIOLOGY SOCIETY. CANCUN, MEXICO, SEPT. 17, vol. VOL. 4 OF 4. CONF. 25, 17 September 2003 (2003-09-17), pages 2675-2678, XP010691445 ISBN: 0-7803-7789-3 -----	1
Y	US 2002/193670 A1 (GARFIELD ROBERT E ET AL) 19 December 2002 (2002-12-19) paragraph '0085! -----	4,10
Y	US 2002/016548 A1 (STADLER ROBERT W ET AL) 7 February 2002 (2002-02-07) claim 17 -----	4,10

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/051989

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
US 2003171661	A1	11-09-2003	NONE		
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US 2002193670	A1	19-12-2002	CN	1520272 A	11-08-2004
			WO	02096288 A1	05-12-2002
-----					
US 2002016548	A1	07-02-2002	US	6324421 B1	27-11-2001
			DE	60020349 D1	30-06-2005
			EP	1164930 A1	02-01-2002
			WO	0057778 A1	05-10-2000
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